

DRAGON USER

A stylized red dragon logo with its head turned back, facing the word 'DRAGON'.

The independent Dragon magazine

50p

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June 1988

Dragon Graphics Screen Transformed

Competitions
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plus a year's sub

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Machine Code

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How to submit articles

The quality of the material we can publish in
Dragon User each month will, to a very great
extent, depend on the quality of the
submissions that you can make with your
Dragon. The Dragon computer was invented
in the market with a powerful version of
Basic, but will very soon discontinue it.

Articles which are submitted to Dragon
User for publication should not be more than
5000 words long. All submissions should be
typed. Please leave wide margins and if
double space between lines the. Paragraphs
should whenever possible be computer
printed on plain white paper and be accom-
panied by a tape of the program.

We cannot guarantee to return every
submitted article or program, so please keep
a copy. If you want to have your program
returned you must include a stamped
addressed envelope.

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Editorial

This month marks the beginning of a new phase for Dragon User — indeed Dragon users all over the country. As from next issue (July 1986) Dragon User will be available to the Dragon community BY SUBSCRIPTION ONLY. And while this means that you won't have to trundle down to the newsagent to get your favourite read (we'll send it to you), it does mean forking out just over a fiver in one month, in order to get the next 12 issues, if you don't already have a sub. So why do it?

It's our firm belief that Dragon User is still essential reading for all Dragon owners, beginners and experienced alike. We'll still have all the same regular features, news and reviews, with new ones planned even as I write! In fact, as a controlled circulation publication, we're hoping to pack even more in than usual — a new upgrading series, new languages for your Dragon, tech-is-it, reader offers, competitions — we are determined to provide you with the service and information you want for your computer.

Take the Book Offer in this month's issue... where else could you get so much for so little?

As the number of active Dragon owners has diminished (and there's no denying that the total is down to the few tens of thousands) it seems to us that the enthusiasm of the existing Users has actually increased — and it's people like you we are committed to supporting in the future.

It would be a shame if many Dragons (still a worthwhile piece of hardware — until the C300 Amiga arrives!) were put away, all for the lack of information and a regular national magazine. No Dragon User — no Dragon? We hope you'll join us.

Dragon User People's Chart

MONTH looking into... anything can happen in the Dragon User People's Chart and look what's happened this month.

The struggle for Number One spot continues with Shocktrooper back at the top and Juxtaposition dropping one place down to the Number Three slot. People obviously spent April enjoying rediscovering Jet Set Willy as it leaped into third place.

Legendary anagrams included "Have I won yet?" from Robin Hemmings (sure, no Robin) some blarney crawling from Neil Cox (John Cox, Expert Editor) and a glum confessional from Alister Green (Anagrams don't like me). However, the prize goes to Ian Roddick, referring to the extra screens in Dragon JEAN — Dragon Heads get the pages Smokey Boys don't. Nice work, Ian.

Don't forget — each month we are asking you to vote for your favourite five programs of the month. They can be games, applications, utilities... anything! While there's down in order of preference on the four opposite (you can copy it out if you can't wait to install your latest) and send it.

Just for a bit of fun — and as an incentive to the more marvellous amongst us — you can also make up a phrase constructed from the letters of your own top three (using summary as you want) and we will pick out the one we consider to be best. That lucky winner will be receiving £25 worth of software from Microdeal.

Results April 1986

- 1 Shocktrooper (Microdeal)
- 2 Juxtaposition (Wintersoft)
- 3 Jet Set Willy (Software Projects)
- 4 Speed Racer (Microdeal)
- 5 Eddie Steady Go (Incentive)

Chart Five

Voting for Chart No. 5 closes at 1pm on Friday 12th June 1986. Entries received after that time will not be eligible for inclusion in that month's voting. The editor's decision is final. Only one entry per individual per month will be allowed.

My top 5: Voting Month 5

- | | Name | Address |
|---|-------|---------|
| 1 | | |
| 2 | | |
| 3 | | |
| 4 | | |
| 5 | | |

My phrase is:

WINTERSOFT PRESENT THEIR FIRST ADVENTURE WITH PANORAMIC GRAPHICS



THE BARONS OF CETI V are the mightiest, most powerful of the under world. Only the bravest and most cunning of the surface world can defeat them. Only the best of the surface world can defeat them.

THE BARONS OF CETI V are

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Dragon Aid Tape

GOOD NEWS — following the disappointment that for a second year, Dragon owners were not to be given the opportunity to join in with the software industry's charity effort (see year 2000 Aid this year Off the Hook), it looks like we might be in with a chance after all — thanks to Christopher Payne.

Payne, proprietor of C&B Software, is proposing to put together a compilation tape exclusively for the Dragon — and like Off the Hook, proceeds would go to the Princess Trust for the rehabilitation of drug addicts. "I was worried last time (said) that we didn't get a chance this time we've

been included again! Dragon devotees it seems!" he comments.

Chris is writing at 5-10 lines a month tape, selling for £8.95 to £9.95 depending on quantity and quality. "I've already got support from Design Design and Peaksoft and have contacted Microdrive", he continues. "I'm looking for anything from text adventures to shoot-outs, primarily commercial software — but if anyone wants to donate their own programs, we will consider them."

Chris was quick to emphasise that other costs have been minimised (primarily tape duplication and postage) all pro-



jects would be going to charity. "I'm not taking anything," he said. "It's a little's good cause."

Dragon User has already pledged full advertising support for the venture, so come on.

If there are any companies or individuals out there that can help C&B Software put this project together, write to: Mr. Ash Grove, Wheelwrights, 51 Albion, Hants, GU4 8DF — or phone 02523 2814. Watch this space for developments.

Peaksoft sponsor Dragon

AS A sponsor to the fast-growing number of Dragon owners on Merseyside, Peaksoft are sponsoring Dragon news pages in The Gallery section — page 323000191 onwards.

The firm are also compiling a directory of Dragon owners who use the service to help Dragon fans meet and be so kept in touch. A free copy of the directory (which is updated weekly) is given to every subscriber of a magazine from Peaksoft and to anyone who requests inclusion in the directory. Further copies, or later editions, are available in return for 50p in stamps.

Details available from Peaksoft at 45 Queen Street, Salford, Greater Manchester, M6 6AA.

Dragon weekend

THE SECOND Dragon weekend in Wales took place at the Tredegar Hotel in Aberdare between 23rd and 25th March. Attendances were up on last time (October 1988), with many users attending their second weekend, although the bigger venue meant that there were still a few places left unfilled.

There was a relaxed and friendly atmosphere from the start, and all types of users from the young to the not-so-young, from new tape-based 32 owners to OS9 experts, enjoyed a weekend of solid 1600 computing.

Those devotees of the 68000 Compuserve were on hand, demonstrating their new Dragon Plus expansion system, and hard disk, as well as their new Colibri 320 software.

Many top stories picked up simply by listening in on conversations going on around the room, from recovering crashed data, to finding Dragon's intelligent terminals. Plenty of suggestions were forthcoming regarding the way the Dragon Market, and Dragon User in particular should go, but everyone agreed that the Dragon has a lot of life left in it yet!

It is not certain if another 1600 weekend will be organised, that is really up to you if you want one. Write to: Bob Morgan, Mid Wales Tourism Council, Caernarfon, Gwynedd, Gwynedd, LL57 2JY.

Micro Vision News

FOLLOWING the success of DragonUser, their first release, Micro Vision has just announced its next game, Talamon. Described by a Micro Vision spokesman as "a Jet Set Willy style graphical arcade adventure" plus the promise of over 100 screens, they could be on to another winner.

The game, heavily steeped in mythology, involves the exploration of a castle (and the woods and fields beyond) — if you can get out! to find a magical talisman.

Early reports are anything to go by — including your possible transformation into a frog then back again in true fairy tale manner — it could be worth looking at. Priced at £7.95, Micro Vision expect to have the game ready for the Lewis store, so why not join along and have a look?

For more details, contact Talisman Vision at 8 Walsley Road, Liverpool L3 5BH.

Preview

FAIR FAIR into the future: the 3rd Federation constructed the TIME 07/05 — cores of unusual matter used by Hyper-spacecrafts for faster-than-light travel. Because of the heavy traffic on the grids it was then decided to extend them. However, in doing so they uncovered a sleeping Time Demon.

They carefully studied the grids around him but were unable to stop his regeneration process.

It was then that they called on you, Time Lord. A genetically engineered Super-mat capable of travelling in the grids without the aid of a space ship.

Your task is to find the four

pieces of the Demon's Talisman, which is scattered in the grids and use it to destroy him.

Unfortunately the creatures and creatures has contaminated the grids.

Well... sounds like someone's got a drastically overactive imagination at Intervest 888. Here you are — details of the contents of Time Lord, their real history, 84 rooms detailed, 410 three maze areas, eight different types of nasty laser turret effects, optional

Priced at £7.95, it should be available from Intervest by the middle of June. Contact them for further details at 144 London Street, Reading RG1 4SS or telephone 0734 591578. Look out in Arcade Arena for a preview, next month.



Communication

Send us your questions, responses, and plans to Communication, Dragon User, 12-13 Little Newport Street, London WC2

Problem: I have recently acquired an Atari joystick and equipment to convert it to a Dragon. I would be very grateful if someone could inform me how to wire it up.

Enquirer: Andrew French, 13 Fairfield, Pinnerham, Pinner, Midd. GL20 0AP

Problem: I have a Dragon 32 and am very pleased with it. However, what are the pros and cons of changing to a Dragon 64 (assuming I can get one second-hand) — apart from the larger memory? Would I still be able to use my HP6 Brother printer with the 64?

Enquirer: J.E. Latham, 15 Ryegate House, Leamington, West Wiltshire

Problem: I would be very happy if anyone could answer a couple of questions which bother me recently: a) Could the second CPU for the Dragon 32 be any CPU or just an 8 bit one — if yes then could that be a 6502 or 68 bit one? b) Could you have a disc system without having a second CPU and if not what type of CPU

would this be?

Enquirer: Yvonne Gosses, 9 Kestrel St, Galside, 11440 Athens, Greece

Problem: I have recently purchased a HP6-80-00P-115 joystick with the HP6-80-00P-100 four colour printer and I was wondering if anyone could tell me how I can dump the graphics screen on my Dragon 32 to the printer.

Enquirer: C. Davis, 57 Eastbourne Grove, Westcliff-on-Sea, Essex SS2 02P

Problem: I cannot obtain an OGS Programming Manual —

has anyone got one for sale, or could I borrow a copy?

Enquirer: Tony Dengerfeld, 26 Lynsted Drive, Clifton, Nr. Preston, Lancs. PR5 75H

Problem: Request the Dragon Games User Group Newsletter — will pay up to £1.00 in good condition. Also Dragon magazine — will pay up to £1.75. Please send details.

Enquirer: Andrew Hill, 10 Perry Jones Close, Forge Side, Blaenau Gwent, South Wales NP23 2AH

Problem: Wanted — Super Dragon Writer II Cartridge or

name and address or distributor for. Also wanted — name of a good book on electronics for beginners.

Enquirer: Barry Geruth, 120 Donaghadee Rd, Bangor, Co. Down, Northern Ireland BT22 4NH

Problem: Dragon centers in the Bognor area — I own a Dragon but don't know anyone there who does. I am very lonely!

Enquirer: P.J. Reed, 27 Finton Road, Filton, Glosport, Hants. PO12 4EP

Communication

Stuck for a routine? Need some obscure equipment? Fading out of it? Fear not — someone, somewhere can help you. Write down your problem on the coupon below (make it as brief and legible as possible) together with your name and address and send it to Communication, Dragon User, 12/13 Little Newport Street, London WC2H 9PP. We'll publish it as soon as we can — meanwhile, maybe there's someone you can help the month!

Problem: _____

Name: _____

Address: _____

SMASH HITS FROM BLABY



COSMIC CRUSADER — experience the war zone of space in this exciting game. You are the last of your kind, fighting for the survival of your species. You will find out the secrets of the universe and the power of the stars. (Dragon 32/64)



DRAGONS OF DEATH — the ultimate dragon game. You are the last of your kind, fighting for the survival of your species. You will find out the secrets of the universe and the power of the stars. (Dragon 32/64)



OLYMPIA — experience the glory of ancient Greece in this exciting game. You are the last of your kind, fighting for the survival of your species. You will find out the secrets of the universe and the power of the stars. (Dragon 32/64)



PHOENIX — the ultimate phoenix game. You are the last of your kind, fighting for the survival of your species. You will find out the secrets of the universe and the power of the stars. (Dragon 32/64)



RUNO YU — THE MASTER
This game is the ultimate in dragon games. You are the last of your kind, fighting for the survival of your species. You will find out the secrets of the universe and the power of the stars. (Dragon 32/64)

DRAGON POWER SUPPLIES
Dragon power supplies are available in a range of sizes. Contact us for more information. (Dragon 32/64)

Dragon games are available for the Tandy Color 16 Computer or Color 16.

Dragon games are available for the Tandy Color 16 Computer or Color 16.

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Dragon User

Dragon User

Arcade Hit

Program: Moon Crests

Price: £7.95

Supplier: Incentive Software
54 London Street, Reading
RG1 4SQ Tel: (0734) 581678

ONE MORE go, just one more go and it's over! This is something you will say a lot when you part with your hard earned pounds in exchange for a copy of Incentive's latest release Moon Crests. In fact you will probably say it for hours on end, day after day. It's just that this game is addictive, you understand, just one more go and it's over, it's over, just one more go.

For those of you who long to remember the original arcade version of Moon Crests, it was probably the first machine that I ever sat with a queue of people waiting to play it.

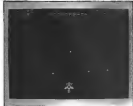
It was that marvellous quality that allows everyone to play a

reasonable game, a game away but gets progressively harder the better you become. You can never say that you have mastered it, it will always get the better of you in the end.

Incentive have obtained the official licence for the game from the originalators, Nintendo, and John Martin (the author) has produced the most faithful arcade copy that I have ever seen.

If you like the space shoot and zap games then this must be the king of them all.

To add you to beating the old eyes, super flies, laser, Dia, metas and alieno gals, you are given a score that consists of three parts, each having its own warning. If you successfully manage to repeat four waves of invincible aliens, then you are given the chance to dock your craft with the next section. If successful then you can double your life-power and (perhaps) make the much easier for yourself. You start with just the top section of the spacecraft with only one gun, and if you dock with the



other two sections, you end up with five.

For those who think they have pretty good reactions when it comes to arcade games, if you manage to obtain a score in excess of 30,000 you will be given a secret message.

This enables you to enter a code to win a free Moon Crests arcade machine.

OK, so it's basically a straightforward left-right fire and — but if you like fast arcade action and are not frightened of spending all your making hours musing just one more go, then get your wallet out and buy yourself a copy.

Ray Coster



Editor

Program: Desktop — Supplied as tape (Disc compatible)

Price: £1

Supplier: Pintercom Ltd, 21 Wycombe Lane, Midsum Green High Wycombe Bucks HP12 3RD

Desktop is a quite powerful graphics editor supplied on cassette, but readily transferable to disc. Side One of the tape contains the program plus some demonstration programs. After loading the program checks if Desktop is present by looking at where the graphics pages start in RAM, and adjusts itself to operate with tape only or disc and tape as applicable.

The software is supplied with the usual well written manual from Pintercom.

The basic idea behind Desktop is that graphics pages can be created and edited down to pixel accuracy and then saved for use in other programs, or as standalone tests. The whole thing is completely menu driven in the usual Pintercom way.

The editing is done on a magnified version of the block, using the cursor keys to point to the required pixel, and then pres-

ing the required colour number to fill in the pixel. It is also possible to draw the whole block to one colour for test filling in.

Other editing functions include use of GELPUT and copying and moving graphics pages around. Anyone who has a copy of Dragon (Data's Pixel Editor (remember that?)) will be interested to know that Desktop has no compatible with it's output by it.

Supplied with the program are character sets for use in Mode 3 (32 columns and Mode 4 (42 and 51 columns). The demonstration programs include a nice version of the sliding puzzle, puzzle game, which unfortunately was rather slowly in parts (a little machine code could go a long way here!).

All the programs are total ly untested and would be of interest to anyone new to programming in Basic graphics. However, the best thing about this software is its price, just £3 for a genuinely useful program which once again shows just what skilled Basic programming can achieve.

David Cadge



Control

Program: Printer Control (Disc) — Dragonsoft/Camera

Price: £8.95

Supplier: MacGowan Consult

ants 8, Auburn Drive, Cynhorpe Nr Grantham, Lincs NG31 3DQ

MacGOWAN'S powerful word processor Printer Control has at last appeared on disc. I reviewed the cassette version back in the August. As result of Dragon User I've given it 5 out of 5. All of the original functions have been kept in the disc version, those were explained in the original review, so I won't go through them all again here, but for anyone new to the program, what you get is a very powerful wordprocessor (40 columns screen) and a simple graphics editor. The big difference here between this and other wordprocessors is that MacGowan will supply a custom version to suit almost any printer (they claim to have done 87 variations so far).

So for the disc version, a four page supplement is supplied to explain the main menus, explaining the slight differences in operation. A useful, and very

necessary option for upgrading the extension program. These loaded into the 40 column display and so does not affect any text to be RAM when called (the display inverts to 38 columns). The extension menu allows access to Dragonsoft functions such as DTP, DSK, HIT, KILL, REPAIR, and it also allows loading and saving of files to cassette.

Unlike the cassette version, the disc version only runs in 32k mode, a slight loss the additional 32k on a Dragon 54. A little extra programming could have made it possible to use all of the available RAM surely? Printer Control was one of the last (and only) programs to use the extra 32k on the 54.

Cassette owners will be glad to hear that MacGowan are offering an upgrade service, which depending on your printer type, will cost between £10 and £15 to replace your cassette with a disc and supplementary manual — a little expensive maybe, but at least they are offering the service to those who want it.

David Cadge



On-line Computing

Beginning an occasional series, Roy Cotes takes a look at communications — starting with Chatplus 2 and Viewdata

THE FASCINATING world of bulletin boards and other telephone-line-mediated information systems has been available to home-micro users for quite some time now, and Compuserve have just produced two packages which enable Dragon 64 users running Flex (and soon for G200) to exploit just about any of these systems regardless of transmission speed or data format. The two packages are *Chatplus 2* and *Viewdata*.

Although there are many modems available on the market priced from £30 up to well over £200 the software has been written with the Datamax modem in mind (although any other modem should work quite happily with this software).

Although the Datamax modem is not BT approved, it is becoming more and more popular amongst the bulletin board users, owing to its excellent features per pound expenditure. Having made enquiries through many of the bulletin boards, I could not find anyone who had anything but praise for the Datamax. In fact, these are some bulletin board services which actually use the Datamax as their link to the telephone network and hence to the user.

Demon

The Demon supports auto-dialling (origin and answer modes, either local or European telephone standards which enables those transatlantic calls to be made (probably at some one else's phone bill) and data transmission speeds of between 75 baud and 1200 baud.

Physically, the modem is well constructed both inside and out, and being housed in a plastic box which is roughly the same size as a single disk drive, you won't have to fight for more table space to accommodate it.

The connections to the unit are made via flying leads which exit from the rear of the case. These are the power cable, the telephone cable and the RS232 cable. The power for the Demon is derived from a transformer which forms an integral part of the main plug. The telephone cable is terminated in a standard BT-type phone plug, and the RS232 cable is a 9-pin 'demon'-type DIN plug suitable for a BBC computer, although a suitable adaptor is available from the suppliers Compuserve.

The list of the packages Viewdata allows a user with an appropriate modem to connect up to any of the Viewdata services such as the Pressed-Moment systems which have proved so popular with BBC owners owing to the black graphics as played by the system (BBC M2367). The Viewdata package shows a 40 x 24 character display as used by Pressed and the character set contains all the necessary

block graphics to display the Pressed pictures. Even though the Dragon's limited display capabilities restrict the package to two colour graphics, this effect is very impressive. The package allows the user to save, review and print status from whichever system is being used. Flow commands may also be passed to the G200 for processing when the Viewdata package is in use.

Chatplus

The Chatplus package is a very comprehensive communications package with a multitude of options to allow connection to either bulletin boards via the BT network or to another Dragon (or any other RS232C computer system) using receive and transmit speeds of between 75 baud and 19200 baud. The data format (start/stop bits, number of data bits, parity etc) is completely variable, with the most common settings being held ready at the press of a key. The default settings on entering the program were used quite happily with all bulletin boards reviewed for this review.

Like Viewdata, Chatplus 2 allows auto-dialling for either data or voice calls. This feature is enhanced by the use of an on-line telephone directory which allows a list to be saved on disk containing the names, phone numbers and at the same time details required for every entry, so that by simply typing the name of the bulletin board or person that you wish to contact, Chatplus 2 will initiate the setting up details and phone number from the disk file, phone the chosen number and either put you on-line or prompt you to pick up the phone without any intermediate user intervention. For the serious amongst us, Chatplus 2 has an option which stores bulletin board passwords etc, also protected from prying eyes by substituting an asterisk (*) for each character typed until the <ENTER> key is pressed.

Because the flow control may be toggled between either the DTR or X-ON/X-OFF forms of protocol, Chatplus 2 allows the Dragon to be connected directly to all sorts of other computer systems. For the purpose of this review a Dragon 64 was connected directly to another Dragon 64 and information passed back and forth with no errors at 9600 baud. Connection was also made to both a DEC VAX-11/780 cluster running under the RMS system and a DEC PDP-11/34 system running under RSC/11M. Again information was passed back and forth at 9600 baud and at 1200 baud with no errors.

The only problem with using a Dragon on a main-frame system is that of terminal emulation. Most mainframes expect the user to be using a specific type of terminal in order to utilize screen editors and applications packages. Maybe a few terminal

emulation packages could be made available? (Chatplus 3?)

The ability to upload and download files enables information and programs on the buffering board systems and mainframes to be downloaded into the Dragon's memory or on to the Dragon's disk and files already before the disk may be up-loaded to the file area on the host system.

Compuserve have also written a program designed to run either as a stand-alone package or from within the Chatplus 2 program. It allows the transfer of data to or from the Dragon, using the XMODEM protocol found on many of the bulletin board services. I have only had time to use this software once to upload and download a program using from a bulletin board and the whole job with its payments unaccounted. The XMODEM standard of data transfer includes a checksum routine, which means that all incoming data is checked for validity before being stored. If an error is detected then the block is re-sent until either the data received is correct or the transfer fails more than a specific number of times. (This may be set by the user.)

In conclusion, all the features of both software packages and the Demon modem worked as advertised. The software was fast, easy to use and reliable. If you have a modem and can start the phone bill then you can't really go wrong with either of these packages — but you'll need a 64 running Mac, remember.

Extras

The only additional cost for those who wish to access it is the membership fee for the Pressed service. This is some £15.50 a quarter, but a good value if you are going to use it regularly. Pressed is only a local call and there is an incredible amount of constantly updated information available to its users. Everything from the latest news and weather to Mailbox systems, semiconductor news, photography hints and tips, etc.

Finally I would like to thank the Spec's of all the bulletin boards that I have reviewed whilst writing the software for this review. In particular the Trade Users group bulletin board (TUX), REACT, and the Liverpool Mailbox BBS. (The numbers for these are 01-200 76577, 0379 518410 and 051-420 8624 respectively.)

Hardware: Demon Modem (Not BT approved)

Price: £28.00 + p&h

Software: Chatplus 2 & Viewdata

Price: £24.95/£14.95 + p&h (Flex)

Supplier: Compuserve, PO Box 164, 256D Green Lane, London N13 5XA.

Jaws!

Just when you thought it was safe to go back to the keyboard...
proceeds action from Steve Guttenberg

BRACING yourself as a scuba diver, but hovering flat. All you have to do is shoot the fish with your spear gun using the 100-ft line. I say: There are three fish, two of which are moving up and down, but the third fish is coming towards you and you must dart in to reach your side of the screen as you will lose a life. You score 100 points for the fish moving down, 50 points for the fish moving UP and 40 points for the fish moving towards you. There is also a random chance of an extra score — this happens if the fish coming towards you “bumps” into any of the other fish you will score whatever the fish bumped into is worth. (After practice, you can learn how to make this happen.)

Shark

Hint #10: Life is never too simple and you find that your head bolts are too heavy so you have to keep pressing the **UP** key to stop yourself falling – also after a random amount of time a very easy Shark appears. You are frozen with your right unable to move or shoot and your only chance is to drop a depth charge on to the nose of the Shark. The depth charge is located at the top of the screen and is self-exploding, press and hold **DOWN** key, you must let the Shark just in front of or on the nose, else the charge will not explode. If you hit the Shark you gain 1,000 points, if you miss, the Shark will come straight for you and kill you. After a set a month you

The game is in PMODE 4, uses bit movement for smooth graphics, several sound routines, and has a simple hall of fame at the end. To enter the game proceed as follows:

First type in **LISTING 2** that is, the header, (as previously printed) Once **PLN** you will be asked for the start address, this is **28000**. Type this as **press ENTER** and you will be asked for the finish address this is **01010**. Type this as **press ENTER** and you must now type in the first row of 8 digits up to but not including the = sign. **LISTING 2** Press **ENTER**. You must now type in the checksum, this is the number in the column after the = sign. Type this in and press **ENTER** — it will tell the real address will be displayed. To save the whole game to tape use **CSA&M**.
JANU 1988 2010 0000

If you want to type in **LISTED** it is small parts, then when asked for the length address type in the address you want to

Block 41. This is where you get the "OK" sign sent to tape using `CRAYEN JAWS: DR00 N` Block where `N` is the block address you specified. Don't forget to `CL0ARD` each part before running the header next time. Each time you reset you use the first address, so

Figure 1. The effect of the number of trials on the mean accuracy of the responses. The error bars represent the standard error of the mean.

To run the game type in EXERCISEBOOK if you have any problems (with computing), contact me at 15 Harmonia St. East, Mississauga, Ontario, L4W 1G9, Canada. Tel: 416-291-1114. After I can supply a copy of the game for \$1.50 which will include support. Good luck!



1000

```

10 CLS
20 REM HEXLOADER = ENTER THE
30 REM STRING OF HEX DIGITS FIRST
40 REM AND THEN THE CHECKSUM
50 CLEAR200,27999
60 PRINT"ENTER START ADDRESS";:INP
70 U$=U$:START
80 PRINT"ENTER FINISH ADDRESS";:IN
90 F$=F$:FINISH
100 FOR N=START TO FINISH STEP 11
110 PRINTN;" ";
120 TT=0:INPUT A$;Z=0
130 FOR G=1 TO LEN(A$) STEP 2
140 P=VAL("H"+MID$(A$,G,2),2)
150 TT=TT+P*16^((N-Z)/2)
160 Z=Z+1:NEXT
170 PRINT" = ";
180 INPUT T$
190 IF T$ <>HEX$(TT) THEN SOUND 30
200 PRINT"ERROR = ENTER LINE AGAIN
210GOTO 100
220 NEXT

```

1000

Listing 3		20044	000000000000000000000000 = 0
		20055	00000000000000000000000000 = 0
20067	16002F000000000000000000 = 9F	20068	00000000000000000000000000 = 0
20011	000000000000000000000000 = 0	20077	00000000000000000000000000 = 0
20022	00000000000000000000000000 = 0	20088	00000000000000000000000000 = 0
20030	00000000000000000000000000 = 0	20099	00000000000000000000000000 = 0

29478	1D17FF6017FF1717FF1E17	=	303	30156	FC90E6060301F0F6060C	=	528
29485	FF2517F230FF606C199094	=	408	30167	00012204102702F066070	=	330
29496	60100FF60621000700C000C	=	451	30179	C1001027F0D71600053406	=	402
29507	251A17F0E617F0F517F0FC	=	635	30189	0E60791000400000005C1F	=	407
29510	17F060FF60601000000010	=	430	30200	17F0C520000000000070000	=	517
29520	0F60601600000000001005	=	30E	30211	00220000100FF007071000	=	306
29540	0E1717FC0017F0D017F0D0	=	506	30222	025F17F010710002F350034	=	400
29551	0F60700100000000000060	=	400	30233	300040700100000000000C	=	400
29562	100020004022513170E00	=	400	30244	1F17F0003000200F070000	=	403
29573	17F0000FF600210000052A10	=	400	30255	1A3025000000000000007010	=	301
29584	0F6060300000000000251017	=	300	30266	0E000F17F0F0170004C0500	=	400
29595	F0910FF607010000000100F	=	520	30277	3030000079000000FC00700	=	510
29606	006032010000000000001000	=	300	30288	0001002000000000000020F	=	370
29617	0000100FF60030FF60701700	=	520	30299	300000F17F0000000000000	=	400
29628	000000077000700000000007	=	600	30310	001017F0C000100FF00070	=	552
29639	00100C070F530F6000000001	=	504	30321	C0000000100F000017F021	=	000
29650	551027000010010270000	=	204	30332	30130F17F05C0000F0000000	=	400
29661	17000217F000000000000000	=	301	30343	0000200F000000000000000	=	400
29672	504000000000000000000000	=	300	30354	007000000FC00000000000	=	406
29683	00000000171300001900010	=	100	30365	20000000200000000000000	=	423
29694	1405100000000100000012	=	0F	30376	007010000000000000000017	=	412
29705	000F00000000000000000000	=	200	30387	F7000000000000000000000	=	500
29716	0E0000000000000000000000	=	400	30398	00000F00001700700017	=	400
29727	A70000000000000000000000	=	400	30409	F0125000F00000000000000	=	500
29738	30000FF200000000FF200000	=	507	30420	0F0000000C3000000000000	=	300
29749	010000000000000000000000	=	500	30431	00107C00070000000000000	=	000
29760	001100000000000000000000	=	520	30442	01000000000000000000000	=	300
29771	2000FF0000F0300000F1231	=	404	30453	0C170000001F10000000000	=	300
29782	0F22FC000000000000000000	=	410	30464	00F00070000000000000000	=	400
29793	270000000000000000000000	=	340	30475	00001C70000000000017F010	=	300
29804	070001000000000000000000	=	470	30486	00000000000000000000000	=	300
29815	000000100000000000000000	=	400	30497	0E000F000017F000000017	=	303
29826	000000000000000000000000	=	400	30508	F000000017F000000000000	=	400
29837	C00017F00000000000000000	=	500	30519	0C00017F005700000000000	=	401
29848	700000127001000000000000	=	417	30530	0F0000000F0000000000000	=	403
29859	000000000017F00000000000	=	300	30541	00F0000F000000000000000	=	700
29870	F00100C10F20000000000000	=	470	30552	00700010000000000000000	=	400
29881	30C30000F000000000000000	=	400	30563	0F001F0000FF00000000000	=	400
29892	F00070C10127100000000000	=	400	30574	71170000000000000000000	=	400
29903	0E000F000000000017F00000	=	400	30585	F0007101120010000000000	=	400
29914	010700700000000070000007	=	500	30596	1F000000000000000000000	=	470
29925	007F00000000000000000000	=	400	30607	01000000000000000000000	=	400
29936	0E0000170000000000000000	=	240	30618	07FFC7000FF220000000000	=	710
29947	0E0000000000000000000000	=	400	30629	FF220000000000000000000	=	305
29958	E70000FF0000F00000000000	=	600	30640	20F00000000000000000000	=	500
29969	50F700700000000000000000	=	300	30651	00000000000000000000000	=	470
29980	F0007000F70070C1190511	=	301	30662	100000F7000000000000000	=	430
29991	50F70070F70070F0000000	=	450	30673	17F00000000000000000000	=	300
30002	F7007017001A100000000000	=	400	30684	302000001C0000200000000	=	500
30013	0F0000000000000000000000	=	300	30695	00000000000000000000000	=	400
30024	222000000000000000000000	=	400	30706	0F100000000000000000000	=	520
30035	C01F17F0000000000000000	=	400	30717	1F17F000000000000000000	=	303
30046	200000000000000000000000	=	400	30728	0C0000001C7710000000000	=	552
30057	0F17F0000000000000000000	=	530	30739	F0100010000000000000000	=	303
30068	007000000000000000000000	=	401	30750	F0100000000000000000000	=	400
30079	0000000F2200000000000000	=	470	30761	000100C0000000000000000	=	400
30090	001000000017F00000000000	=	400	30772	00107017F00000000000000	=	300
30101	30C000000000000000000000	=	500	30783	00001000000000000000000	=	400
30112	FF2200000000000000000000	=	400	30794	00700000000000000000000	=	500
30123	F00070C200001670FF200011	=	500	30805	00720000000000000000000	=	500
30134	000100000000000000000000	=	500	30816	07007000070000000000000	=	500
30145	F70070F20000000000000000	=	400	30827	70070000000000000000000	=	500

Changing bases

Part Four of our machine code series — this month Jason Orbaum looks at Numerology

HELLO, and welcome to Part Four of the series that looks set to make War and Peace look like a pamphlet. And there is something very different about this report's layout. Yes, I'm writing it in the first person singular. There's a very good reason for this.

About three weeks ago Geoffrey came into my room at about eight o'clock and said: "I hope you don't mind Jason. I used your notebook."

"I'm sorry Geoffrey," I replied, "but I do object actually because you have placed and guaranteed and lots of other horrible things like that."

"That's all right," he said, "I used it to clean my shoes."

Suffice it to say that Geoffrey is now carrying new accommodation. But will return at a conditional branch next issue!

And to be frank, firstly an apology. We promised a complete explanation of the assembler directives full coverage of addressing modes and a tutorial on the branch instructions. Last month too in fact these things will follow a later edition. This month there are some more important things which it occurs to me need explanation, namely: base numerology (as promised) memory organisation and the precise meaning of single and double precision.

Numbers

Firstly then, base numerology. The way I intend to teach it is the only I repeat, we taught. Although the next few paragraphs may appear pedantic and an insult to the intellect, they are written assuming a total lack of mathematical knowledge. In base numerology simply must be understood if machine code programming is to be achieved with ease (it is quite possible to program in decimal only, but what about reading the assembled code or writing in a way where the numbers actually mean something)?

The basic numerology lesson runs thus:

1) We live on a planet where the dominant species is the human being. Humans in general have ten fingers. Therefore the best counting system to use is one which works in multiples of ten; one is called ten (known as decimal).

2) We therefore have ten digits (zero to nine) which can be used to describe any real, rational, non-infinite number.

3) A number is arranged in columns each of which stands for a multiple, or is to be more precise a POWER of ten. The power of ten are more clearly explained in the following table:

- 10⁰ Ten to the power zero: 1=1
- 10¹ Ten to the (power) one: 10=10
- 10² Ten squared: 100=100
- 10³ Ten cubed: 1000=1000

- 10⁴ Ten to the four: 10000=10000
- 10⁵ Ten to the five: 100000=100000
- and so on up until ten to the power infinity which is a number too big to represent (10[∞]) in the table the contents are a multiple of: 10/10=10/10=100.

We can see that to write ten to the power X, where X is any number between zero and infinity we simply write a one with X number of zeros after it. Very simple really? So what use is it?

4) Any number can be written in word form in three standard ways, which are the ways the number can be spoken. Thus the number 12 can be written as "twelve" or "one lot of ten and two units" or "one lot of ten to the power one and two lots of ten to the power zero". The last is both the most useful and the most appropriate in base numerology of the three. The reasons for this require demonstration thus:

Demo

Take the number 1100001100. It can be addressed in each of the three ways:

- A) "One thousand one hundred and fifty nine million three hundred and ninety five thousand one hundred and twenty nine."
- B) "One lot of one thousand million, one lot of a hundred million, five lots of ten million, nine lots of a million, three lots of a hundred thousand, nine lots of ten thousand, five lots of a thousand, one lot of a hundred, two lots of ten and nine units."
- C) "One lot of ten to the nine, one lot of ten to the eight, five lots of ten to the seven, nine lots of ten to the six, three lots of ten to the five, nine lots of ten to the four, five lots of ten to the three, one lot of ten to the two, two lots of ten to the one and nine lots of ten to the zero."

Conversions from Binary to Decimal

Pick a number. Any number. Say 11010110 binary.

To convert this to decimal, we make use of the fact that, working right to left, each digit represents rising powers of two. Therefore our binary number is:

$$(0 \times 2^7) + (1 \times 2^6) + (1 \times 2^5) + (0 \times 2^4) + (0 \times 2^3) + (1 \times 2^2) + (1 \times 2^1) + (0 \times 2^0)$$

We can disregard all zero digits, giving:

$$(1 \times 2^6) + (1 \times 2^5) + (1 \times 2^2) + (1 \times 2^1) + (1 \times 2^0)$$

Multiplying out the powers of two gives:

$$(1 \times 64) + (1 \times 32) + (1 \times 4) + (1 \times 2) + (1 \times 1)$$

or:

$$2 + 4 + 16 + 32 + 128 = 182$$

The powers of two are 1, 2, 4, 8, 16, 32, 64, 128 and so on, so it becomes fairly easy, with practice, to teach a binary number and hear it out on the go.

Conversions from Hex to Decimal

The principle here is the same as for binary, except that we are using powers of sixteen:

$$59C = (5 \times 16^2) + (9 \times 16^1) + 12 = 144 + 12 = 156$$

Description (C) can be re-written in figures thus: 1150001100 = 1.10⁷ + 1.10⁶ + 0.10⁵ + 0.10⁴ + 0.10³ + 0.10² + 0.10¹ + 0.10⁰

It is equally which of the word descriptions are easiest to get to from the original number, but it is obvious which word description is easiest to teach the number from.

5) Let us now imagine a planet where the dominant race is a species with only eight fingers. The best system for them to use would be one that works in multiples of eight. The base eight system (known as octal). This system has eight digits (zero to seven) and any real, rational, non-infinite number can be represented within it.

6) Every real number is arranged in columns each of which stands for a power of eight thus:

- 0⁰ Eight to the zero: 1
- 0¹ Eight to the one: 8=8
- 0² Eight squared: 64=64
- 0³ Eight cubed: 512=512
- 0⁴ Eight to the four: 4096=4096
- 0⁵ Eight to the five: 32768=32768
- and so on up to eight to the power infinity which again is a number too big to be written down.

7) Any number in octal can be written down in words in one of three ways, again these are the ways the number can be spoken. Thus the number 123, where the subscript represents the base, can be written as "One two-base eight", or "One lot of eight and two lots of one", or "One lot of eight to the power one and two lots of eight to the power zero".

The advantage of the last method must again be shown by example: 347021.

- A) "Three four seven six two one base eight."
- B) "Three lots of thirty two thousand seven hundred and forty eight four lots of two."

Printed and ninety six, seven lots of five hundred and twelve, six lots of sixty four, two lots of eight and one unit.
C) Three lots of eight to the five, four lots of eight to the four, seven lots of eight to the three, six lots of eight to the two, two lots of eight to the one and One lot of eight to the zero.

Provided we can work out powers we can easily convert from version (C) to version (B) and from there to decimal. The maths would look like this:

$$347021_{10} = 3 \cdot 8^5 + 4 \cdot 8^4 + 7 \cdot 8^3 + 2 \cdot 8^2 + 1 \cdot 8^1 + 1 \cdot 8^0 \\ = 3 \cdot 32768 + 4 \cdot 4096 + 7 \cdot 512 + 2 \cdot 64 + 25 + 1 = 58204 + 16384 + 3584 + 128 + 15 + 1 = 126873_{10}$$

The last subscript can be dropped, as any number without a subscript is assumed to be in base ten in mathematics.

From here we can generalize:

B) Let us imagine a planet where the dominant species is a creature with Q fingers (where Q is any positive whole number above one). Here, the simplest system of counting to use would be one that works in multiples of Q. The base Q system. There are Q digits (zero to Q-1).

C) The number is in base Q and is presented in columns each of which represents a power of Q. The powers are calculated thus:

Q^0 Q to the zero: 1
 Q^1 Q to the one: 1 Q=Q
 Q^2 Q squared (or Q to the two): 1 Q Q
 Q^3 Q cubed (or Q to the three): 1 Q Q Q
 Q^4 Q to the four: 1 Q Q Q Q
and so on up to Q to the power infinity which is a number too big to be written down.
Any number in base Q can be written in two ways, thus 110 can be written "One two base Q" or "One lot of Q to the one and two lots of Q to the zero".

10) To convert from base Q to decimal the maths is worked out thus:

$$122R1_{10} \\ = 1 \cdot Q^4 + 2 \cdot Q^3 + 2 \cdot Q^2 + 1 \cdot Q^1 + 1 \cdot Q^0 \\ = 1 \cdot 100000 + 2 \cdot 10000 + 2 \cdot 1000 + 1 \cdot 100 + 1 \cdot 1 \\ = 100000 + 20000 + 2000 + 100 + 1 \\ = 122101_{10}$$

We cannot continue from here satisfactorily without knowing what Q is.

Lesson

Thus ends the lesson in Pure base mathematics. Now comes its application. Fortunately when computing we need not work in terms of a base of an unknown constant (in base Q) following the structure of the constant variables as to work in any given base. The two bases most commonly used in computing are Binary (base 2) and Hexadecimal (base 16).

Binary is used because this is the base that a computer "works" in. As has been explained before a computer circuit can be in one of two states at any given time. It can either be on or off. These states are represented mathematically by the digits 1 and 0. Thus when debugging a program in PRADO 4.1 any particular point can be black or white (or green in SCREEN 1.0). That if we take eight points which are alternatively on and then off a binary representation of them would be

10101010, = 170

(the number is represented to the assembler by use of the PreAs % which tells the assembler that the next number is in binary i.e. 10101010)

And by an amazing non-casual/accident, to produce this exact pattern in the top left of the screen in this mode we simply POKE location 1024 with 170. More of this much later when we come onto graphics. Base two is used also for mathematical work as we shall see in two months' time.

Hexadecimal uses sixteen digits; they are, in ascending order, 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F. Thus a (short for hexadecimal) number can look like this: 3AFC...

or, in assembler language, 3AFCB with the dollar sign (or Encoder at least) telling the assembler that the next number is in hex. The reason we program in hex is that it is very easy to convert from binary (hex and hex is easier to use when studying patterns. Conversion from binary to hex is incredibly easy, all that is needed is the following table:

Decimal	Binary	Hex
1	0001	1
2	0010	2
3	0011	3
4	0100	4
5	0101	5
6	0110	6
7	0111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F

For detail that %1111 is the highest number possible with four binary digits, or bits (a byte: remember?) and that 9F is the highest number possible with a single hex digit. Thus a byte composed of eight bits can always be represented by two hex digits. To convert to simply state: Simply split the binary number into groups of four adding zeros to the beginning of the highest cluster thus:

a) %1011011 splits to %0010 and %1101
%0010 = 2
%1101 = D
thus %1011011 = 2D
b) %101110101001 splits to %1000
%1110, %1101 and %1001
%0000 = 0
%1110 = E
%1101 = D
%1001 = 9
Thus %101110101001 = 0E99

This leads us rather neatly into single and double precision. They can now very easily be explained. Simply, a single precision number can be held in one byte and thus represented by up to eight digits in binary (up to two digits in hex) and a double precision number can be represented by sixteen bits and sixteen digits in binary and eight digits in four digits in hex.

And so finally, to the organisation of

memory which will be explained to enable skilled programming. Basically we can think of memory as a long line of boxes placed next to each other (yes, I know it's a cliché, but why do you think it's a cliché — because it's a very good description).

Each of these boxes can hold a single (signed) number, or an integer between -50 and %11111111 or 50 and 9FF or D and 255 inclusive. In the Dragon there are %1111111111111111 or 9FFF or 9999 boxes although half of them (over 32768 onwards) have been taken with a set number made that cannot be changed — they are in ROM. The first 32768 (from 0-32767) can have the number within them changed at any time by the programmer.

0-3FF	Systems Use
0FF	Direct Page RAM
3FF	Extended Page RAM
400-9FF	Text Screen Memory
000-3FF	Graphics Screen Memory
3600-7FFF	Programs & Variable Storage
8000-FFFF	Basic Interpreter
0000-FFFF	Cartridge Memory
FF00-FFFF	Input/Output
FF00-FFFF	SMM Control Bits
FF00-FFFF	MPU Vectors

If a double precision number is stored at a location, the high byte (the first eight binary digits after zero) have been added on to the front make the number of binary digits up to sixteen and two digits (up to four) is stored at that location and the low byte (the remaining eight binary digits or two hex digits) in the next location. Eg. to store %1110091110 (%09E) is location 1004. Location 1004 will contain %00000011 (001) and location 1005 will contain %10001110 (%82).

Revision

I hope that this month's article (which has derived somewhat from the practical course!) has helped to clear up any problems that caused about the basics of programming. From here onwards in the terminology used in this tutorial will be assumed understood and used frequently without explanation in future parts. To briefly run down what has been assumed understood: Base notation in mathematics and assembler form the separated or power theory, single and double precision numbers, Memory arrangement, Mathematical notation for multiplication, conversion from any base into decimal, conversion from Hex to binary and vice versa. Got that?

Next month, an explanation of the Branch instructions and an introduction to dry running. If there's anything you do not understand that has been covered please write to the usual Dragon User address and maybe I can help.

I shall go now, there's someone at the door about printing. Goodbye! A moment

Graphic Display

Printing text on the graphics screen — all is revealed by Peter Whittaker

FOR A long time I have been bored with the Dragon's (black or green display, and so eventually got around to doing something about it. I wanted to write a routine which would allow printing on both the usual green text screen, and the orange alternate screen. It also had to print text to the PMODE(4) graphics screen, at a variety of different ways: to allow the mixing of text and graphics. Lastly, it was not to interfere with the normal running of the computer, so that tape and printer operations would still function normally.

The end result was Gashed, which resides in memory from 20000. This program will intercept the Dragon's print routine and replace it with its own. This means that all text messages can be displayed on the graphics screen, and not just deliberately printed strings.

Graphics

There is no need to display the text screen for anything at all. The Dragon has a true graphics machine, with error messages and loading program titles being displayed on the graphics screen. It is even possible to program the Dragon from the graphics screen!

First CLEAR(20) 20000 (just Enter) and RUN the loader program (using # 1) and then type in the code for 'Gashed' when this has been saved to tape. EXEC 20000 to install the routine. The screen will switch to graphics and display the Copyright message. The CLS command and the -CLEAR- key have been redirected to also CLS the graphics screen. The routine is completely transparent to Dragon Basic.

To change the display screen you use the SCREEN command (SCREEN(1) or SCREEN(2) etc). Another noticeable feature is that the graphics screen can be displayed by a simple SCREEN(0) command. The display does not revert to the text screen when the computer prints its OK prompt.

There are several special functions written into Gashed to give greater control over the printing. These are all called from the PRINT CHR\$(...) command (Table #1 gives a full list).

CHRS(0) — disconnects the routine. The program still remains in memory, and may be recalled by EXEC 20000, but will not interfere in other routines when taken (eg DAData assembler) carriage).

CHRS(1) — stops the routine from printing on the graphics screen. Text will still be displayed on the text screen, and commands can still be entered from the keyboard, but they will not be listed on the graphics screen. This will stop the computer from printing ugly messages over great works of art on the graphics display.

CHRS(2) — reconnects the graphics print routine.

CHRS(3) — turns the graphics screen scroll routine off. Text will be printed down the screen as usual (text when the bottom line is reached), the screen will not scroll and the bottom line will be overwritten again and again.

CHRS(4) — disconnects the scroll routine.

CHRS(5) — changes the print to be OFF with the background before printing. Text will be white on black or white on white (invisible). When printing in this mode, text will not destroy the graphics it prints over.

CHRS(6) — causes the print to delete its background when printed. Any graphics will be rubbed out. Print always white on black, but if the background is white the text will still be white in a black surround. Graphics can of course be drawn over this text once printed.

CHRS(7) — will cause the text to be EDPed with the background before printing.

```
0 = DISCONNECT
1 = PRINT OFF
2 = PRINT ON
3 = SCROLL OFF
4 = SCROLL ON
5 = PRINT 'OR'
6 = PRINT 'I'
7 = PRINT 'EQ'
14 = SET WHITE
    BACKGROUND
15 = SET BLACK
    BACKGROUND
```

Table 1

This has the effect of producing a white print on a black background, or a black text on a white background. Any underlying graphics are not destroyed.

CHRS(8) — sets the code for a background.

CHRS(14) — changes the background colour from black to white. It also reverts the background, the CLS command and the scroll routine. It will also search the EOF text of GASH(2) so that the printer be seen on the white background.

CHRS(15) — restores the standard black background, undoing the effects of the CHRS(14). However, it does not change the print type (2-7).

'Gashed' comes complete with its own predefined graphics character set. These can be modified by POKEing the appropriate code into memory. Using #2 as a program to do just that. When run the program will display the letter 'H' and wait for a prompt. Pressing the <Shift> key with either the up or down arrow key will cause the program to display the next letter above or below. In this way the whole character set can be examined at leisure. To find a letter quickly, press the <U> key and the program will then ask which letter to display. Pressing the <D> key will allow you to select a character by its ASCII code (eg, 66=A, 68=B, etc). Pressing the <Q> will exit the program.

When the program runs it displays each graphics character on a large grid to the left of the screen. If the character is not the desired shape, press the <+> key to toggle it. The computer will then prompt for 12 string inputs on the right hand side of the screen: operate the graphics character. Each input should be eight characters long, and be comprised of a series of ones

```
10 'NEW LOADER FOR 'GASHED', REMARK
    'Y DUMP, BY PETER WHITTAKER
20 START = 20000
30 FINISH = 32000
40 FOR N=START TO FINISH STEP 8
50 PRINT N, " "
60 TT=0: INPUT AS Z=0
70 FOR M=1 TO LEN(AS) STEP 2
80 L=ASC("WHITTAKERAS,M 2")
90 TT=TT+L*POW(2,Z-1)
100 Z=Z+1: NEXT M
110 PRINT " "
120 INPUT T
130 IF T=0 THEN PRINT "error - END
    OR LINE AGAIN" GOTO 30
140 NEXT N
```

Listing 1

— **Language:** English — **Media:** Video — **Keywords:** *See* **Keywords**

Danger Zone

The in's and out's of the Clear command on the Dragon explained by Pam D'Arcy

YOU MAY have tried to run some machine code and had quite unpredictable results occur because of having omitted to carry out a required CLEAR statement prior to CHGDIR/EXEC. As some disk users have found out to their cost, failure to follow such operating instructions when a disk is in the drive can cause the catastrophic destruction of both the main AND backup directory sectors of the disk. (But the machine was clear — I just only just switched on.) Such a major disaster from such a small slip — are some of the comments.

I am afraid so, but here I offer this brief insight into what goes on in the Dragon's memory in the hope that it will fit itself in the forefront of your memory and ring the danger bells before disaster envelops your system. Table 1 looks at Fig 1 and the associated Table 1.

Even when you haven't given the Dragon any work to do, it is not idle. It arranges other things, continuously checking for keyboard input and updating the TIMER value approximately 50 times a second when carrying out such actions, it is using an area of memory for temporary workspace. This area of memory is known as the Hardware Stack.

Even when our programs are running,

screen loss, the Dragon continues to carry out the keyboard check and updating of the TIMER value, using the Hardware Stack for temporary storage — as before.

At switch on, the Hardware Stack starts either highest address of Area D and expands backwards towards the start or lowest address of Area D. It is not a fixed size but expands and contracts (always from the highest address down) as it needed though normally uses only a few bytes at a time when carrying out the hardware functions such as checking for keyboard presses and TIMER updates.

This doesn't generally bother us unless we need to run some Machine Code in an area of memory that clashes with the Hardware Stack at any time or that a Basic program may be using that area for its workspace storage. It is the corruption of these areas by our Machine code that causes the chaos because it causes the Dragon to lose its way in its very necessary strictly ordered existence. The high address area of the Dragon, even when it is switch on, is particularly vulnerable.

The CLEAR statement is used to guarantee a safe house for machine code using the option CLEAR parameter 1 (optional parameter 2).

Parameter 2 is the start address of Area F — an area reserved for machine code use (its actual size is a byte out). Whenever the start address is changed, the start and end addresses of Areas C and D are automatically adjusted, that is, the highest address of Area E becomes the address 1, the highest address of Area D (and hence the Hardware Stack) becomes the highest address of Area E-length of Area E.

Parameter 1 is the required length of Area E. The highest address used is unchanged in lowest address is the highest address — (parameter 1) + 1. The length of Area E is set to 200 at switch on, identical as parameter 1 of the last CLEAR statement issued (whether from the keyboard direct or from within a program). This then automatically adjusts the highest available address of Area D, and hence the starting position of the Hardware Stack.

For example, if immediately after switch on you wish to run a machine code routine that is 400 bytes long at its default load address of, say, 32500, if you do not make the safe house for it a well kept area in the area occupied by the Hardware Stack (see Fig 1) with updateable results. By typing CLEAR200 32500 <ENTER>, the resulting top end of memory map would be as shown in Fig 2.

The HARDWARE STACK now starts at address 31999 working downwards. One or more machine code routines may now be loaded into Area F, 32500-32767, and be EXEC'd with no fear of corrupting any of the Dragon's vital workings (unless the machine code is a little naughty!) irrespective of anything corrupting it unless a Basic or other machine code routine (PROMs) into this area directly.

To those who have suffered because of the Dragon's way of doing things, I can only commendable and say — believe me, it is not a stupid way of organising things but a very powerful dynamic system that outstrips other popular methods by miles.

- Area A — 1536 bytes reserved for Basic Interpreter workspace
- Area B — 1536 bytes, automatically and only reserved for Dragonoids if the cartridge is attached at switch on
- Area C — Default low graphics pages of 1536 bytes each
- Area D — Where our Basic programs are loaded into memory and the space that non-string and array variables occupy
- Area E — Default 200 bytes reserved for Basic simple string variable storage
- Area F — Default one byte reserved for machine code

Table 1

Fig 1

MEMORY MAP AFTER CLEAR 200, 32500 AFTER SWITCH ON

31999	32000-32199	32200-32767
AREA D	E	F

Figure 1.
MEMORY MAP AT SWITCH ON

Cartridge based system:

0-1535	1536-7679	7680-32255	32256-32764	32765
A	B	C	D	E

Dragon200 based system:

0-1535	1536-3879	3880-9215	9216-32255	32256-32764	32765
A	B	C	D	E	F

Cyclic Error

I WROTE informed to read your reply in the February issue to PF Götter's query about Cyclic Re-
dundancy

The first step I used to backup all my tagged programmes did
crashed this error after the work
had been done. I have done a
sector search and replaced the
error to one of the Directory
tracks. I would like to know
as if there is a fault on one of the
directory tracks why does the
machine read the second one?
What is the point of two copies of
the directory if the track is cannot
be used?

b) How can I salvage this disc?
Paul Rownworthy
11 St Johns Road
Wimbor
Jersey
ZE4 2GA

ONLOROUS automatically
keeps a backup of the directory
on track 16, and uses the direc-
tory on track 20 for all its I/O.
Quite why the authors of Onlous
decided never write the code to
automatically use the backup
directory if the main one failed is
a mystery. However, you can
salvage a disc with a directory
error simply by typing in the
following:

```

CLEAR 000
FOR I=1 TO 16:INCR I
  1.16.0.00 NO:WRITE
  1.20.0.00 NO:BACK

```

Port Whine

COULD you please tell me if there
are any interfaces to connect an
RS232C plug up to the cartridge
port on the printer? If there are
none of these could you tell me
how to re-wire the lead to the
cartridge port?

Philip Jagger
Arlington
25 Gainsbury Road
Hendon
Middlesex

IF it's possible to buy an interface
which will plug into the Centronics
printer port and convert the
parallel output to RS-232C serial
data. However, there are quite



expensive (I once paid over £100)

A cheaper solution is to use an
interface which plugs into the
cartridge port.

For example, Compuserve can
supply a dedicated RS-232C and
local digital interface for around
£50 which includes software as
FOM

Slow 3-D

I HAVE written a machine code
program to create 3-dimensional
objects on the screen like the Maze
program in February's Dragon User.
At the moment it calculates the
screen co-ordinates and then
returns to Basic for the LMD
command to be used. This obviously
slows the program down as could
you tell me how to use the LMD
command from machine code?

G Parkinson
35 Park View
Maiden
Hampshire
RG6 7LS

UNFORTUNATELY, it is not a
simple matter to call the ROM's
low assembly routines from
machine code. In fact, doing so
will cut speed up your program
very much anyway, as the major-
ity of the time is spent in the
routines, and not in the Basic
evaluating the expressions.

The reason the ROM routines is
not that fast is that it has been
written for work in any of the Basic
graphics modes using vari-
ables, and no direct numbers to
the LMD command will speed
things up a bit, but the only real
way to get very fast low assembly
is to write your own routines which
operate in the same way only

Copy

I OWN a Dragon 32 with Dragon-
dos and one disk drive. What I
would like to know is, at there any
way of speeding up the copying of
files, and reducing the number of
swappings necessary and take a
long time to copy just one disk
with only one drive

Frank Speck

THERE ARE inevitably two things
you can do to speed up also
copying on a single drive system.
Firstly, as the backup command
uses all the RAM it thinks is
available, removing all the
graphics pages will decrease the
number of disc swaps necessary.
This can be done by typing, at a
direct command,

```

PUSH 20,10:POKE 8070,0:NEW

```

Secondly, turning off the auto-
matic verification will also save
sector from being re-read after
loading writes. This can speed
things up quite drastically, but
you do sacrifice the security of
knowing that the backup disc is a
perfect copy. Typing VERIFY OFF
will stop verification - remember
to turn it back on with VERIFY ON
afterwards.

Strings

PART OF a program I am writing
involves adding and subtracting
strings of numbers such as
"12-10-22-1" etc. I have tried
using the HAL command, as in
3-VAL("3-10-1") but this just
returns the value of the first
number. Can you tell me what I am
doing wrong or suggest a better
way?

Paul Rownworthy
Gainsbury Road
Hendon

THE HAL command only expects a
single literal number to the
string as its argument. What is
needed is an EVAL command,
which the Dragon lacks.

The routine listed below is a
very simple 'expression evalua-
tor' which can be used to
return the value of the string after
the variable ? As it accepts only
addition and subtraction are
allowed, but the routine could
easily be expanded to deal with
other operators and parentheses.

```

000 P=1:LEN(A$):GOTO 005
005 T=0
010 IF P=1 THEN RETURN ELSE
015 GOTO 005:AS P
020 P=P+1
025 GOTO 005
030 IF C=C1 THEN T=T+V
035 IF C=C2 THEN T=T-V
040 GOTO 005
045 FOR J=P TO 1
050 IF INSTR("0123456789",
055 MID$(A$,J,1)) THEN NEXT
060 T=VAL(MID$(A$,P-J
065 RETURN

```

Wordy Problem

PLEASE could you tell me how to
make the following program
accept a word instead of just one
letter. I want the input to be
ignored with a beep if the word is
wrong.

```

100 G=INSTR("A-Z") IF G=0 THEN
105 GOTO 100
110 P=INSTR(1, A$) AND IF
115 P=0 THEN SOUND 1:1
120 GOTO 100
130 REM rest of program
Howard Bookout
2 Gainsbury Gardens
Hendon
Middlesex

```

FROM your letter, I assume that
you are trying to check for a
password in your program. The
machine below will wait for the
word to be typed in, but will
not print the characters typed.

```

000 P$=""
005 G=INSTR("A-Z")
010 IF G=0 THEN GOTO 005
015 G=INSTR(1, A$) AND IF
020 P=0 THEN SOUND 1:1
025 GOTO 005
030 P=P+1
035 GOTO 005
040 IF P=LEN(P$) THEN SOUND
045 1:GOTO 000
050 REM rest of program

```

DRAGON USER

&

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HELLBO AGAIN and welcome to a very special column. Yes, this is a celebratory column. This column is two months old today! And all over the country the celebrations have started, dancing in the street, dancing in the dark stairwells in the night, exchanging glances, wandering in the night, what were the chances, that The Expert might write a complete column without mentioning arcade games?

Yes indeed, this is the second edition and I'd like again now to thank all those of you who wrote saying how excitedly they'd found the first one. In fact this column was awarded the coveted title of "Best Arcade Column in A Publication Called Dragon User". I stand a proud man.

So to work. Thank you for the Pokies you have sent and please hang them getting, this month's contribution comes from Mr. M. B. R. Vire of Dagenham (looking like for reality is there) who after an affectionate dog of Peter D. Burgh has presented pokes for your decoration. He says that the colour location should be poked with 224, 222, 240 and 240 for Green 4-colour, Blue 4-colour, Black/Green, and Red/White screen colours respectively.

Some of these pokes require the action to be disabled using the alpha mentioned Paul Budge's methods (see Letter Dragon User, February 85). Here they are:

DUNKY MONKEY LIVES 15120 COLOUR 15622

ASTROBLAST COLOUR 21957

SCREENING ABOVE COLOUR 19999 (UPP 12 8625) JET BOOT COIN COLOUR 7325

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GUTHRIE IN THE COOL LIVES 8595 (MAX 14) **CHAMBERS** LIVES 10228 (This does not work on the Perrydilly edition)

BOONHOPPER COLOUR 12827

CHACHWOOD LIVES 12644 **ROBBIE'S REVENGE**

LIVES 15215 **TURBWAY ARMY** LIVES 12567

STRAY LIVES 12567 **STRAY LIVES 12567** (POKE TO ZERO FOR UNLIMITED)

JET SET WILLY COLOUR 7325

DAVE FIGHTER LIVES 27076 (POKE TO ZERO FOR UNLIMITED)

GALACTIC RAIDERS LIVES 12884

HORACE (OOPS) SPIND COLOUR 26786

ROBIN HOOD LIVES 15712, COLOUR 15684

SEA SWARM COLOUR 26585

SHOCKTROOPER LIVES 12555

And up Mr Vire claims the title of "King of the Hackers", unless, as father would say, you know better.

The next item was good fun, and whilst more, I would it come from Simon Mythen who lives in Chertsey (see you down the back some time Simon?) and runs this.

"After recently purchasing A-Sell from Muzakid (where have you been for the past million years Simon?) I was determined to find some sort of formula for getting all possible and the right ball. Well, I have succeeded! The procedure is as follows:

Break — Put the joystick in the top left position. The flashing line will appear after pressing the fire button. Leave the joystick where it is and press the fire button again. Finally, give the ball at the top, top right spin. Then let the ball with maximum force.

2nd Shot — Put the joystick in the bottom left position. Use bottom left spin and hit the ball with the third power.

3rd Shot — Again, bottom left on joystick and top right spin. Use full power.

4th Shot — As the second shot but use full power.

5th Shot — Top left on joystick and top-right spin. Third power.

6th Shot — Joystick top right and for spin put the joystick slightly to the right of middle bottom. Maximum force.

7th Shot — Leave the joystick where it is. Top left spin and second power.

8-Ball — Make sure that the flashing line passes straight through the middle of the 8.

that, use middle spin and the central power.

I've tried this and believe me it works (even a Cabinet Minister can do it and they have very, very, very small brains) and it's great. If you have any solutions to other arcade games then please send them in. I think you'll agree that they're more fun than Pokies!

Just to make things interesting this month before you will see a number of screen shots of some old Dragon games — just like a shot down memory lane, isn't it?

Well — if you think you can identify them then write in to me — and the first one out of the hat (the ceremony to take place on June 13) will win a year's worth of subscription to this august journal *Best of Luck!*

So, there's about it for this month, except to say to G.

Flower at Glasgow that if he ever sends the another letter in that infamous green pen I shall personally come around and show him a new use for Jet Set Willy, possibly rendering it in the process! Because he has won the award for "Worst Letter Ever Written Ever Since Your Sir When The World Began Ever!" I do not intend to tell him the joke he wants for Jet Set Willy for several months, even though we'll be publishing a map next time! So, that's it for this award winning second birthday column. I wonder if this one can win the award for Most mentions of Cabinet Ministers ever in an arcade column in a magazine called Dragon User. It's a hope, isn't it?

Remember, Cabinet Ministers are human too.

Remember, Arcade column writers often do.



Mystery Picture A



Mystery Picture B

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Expiry Date Signature



Look? MICHELI said I'd hope this time to look at both *The Mists of Kushand Space Trek* as up being even of my word I'd do just that. Let me deal with *Space Trek* if that, and if you read the last column you'll know I was very, very, aware about *Space Trek*. I wasn't by a writer and being said by him in his guest as (Broomhoff) This was quite a common human adventure — I don't intend was set in a school, but on board the steering Endeavour. Though the plot was derivative of many a star *Trek* tale, the program was well done and the game had many unusual and enjoyable touches.

Sequel

So what of *Space Trek II*? Said to say it relies rather too heavily on the last program, although the story has moved on somewhat. You have managed to arrive at the planet Pookin, and the top steering Endeavour is coming above it — you're in the fifth stage of the Endeavour series, and have to find out what happened to the first four. Here's one of them at any rate, and a scan of the ship has given you the useful information that the crew have all lost their minds. Probably been watching too many *Star Trek* repeats, that no, their ship is trapped in a strange force coming from the planet, and you must organize a landing party to investigate before they're up and downstage the force.

The program works in the same way as the first, in that you can switch between any of four characters, James, Nelson, Spenser, and McCondie. Just as impressive as before, except that the author has decided that this adventure will still begin by centring on the vast number of local bits on the Endeavour. I explained last month that the steering really is vast, and mopping it all gives you the feeling of actually exploring the ship as you move up and down between the six different levels of locations. As you begin *Space Trek II* you soon realise that the steering has been redesigned exactly as before, and you encounter the same objects and people in the same places as last time round. I found this to be very disappointing and an awful waste of precious memory.

I come to being irritated as this, as I begin I worked out from the first game how to get off the ship and on to the surface of the planet Pookin, and perhaps when you do this the adventure opens up more and becomes very different, but even if that is

the case I can't see that there is going to be the memory available to make *Space Trek* sufficiently different to stand alone. A quick inspection of the unprinted program shows the locations that are on the planet's surface, but I keep in mind fewer than the ones in the steering that are duplicated from Part I. With the ability to switch between characters and move them independently the game should have perhaps begun with them already down on the planet, which would mean you could have had any type of setting that you cared to create — jungle, desert, deserted city — and made it much more comprehensive and as convincing as the first just was.

Nevertheless, if you're at all interested in adventures and particularly in seeing them, you should invest in and get at least one of these two titles from Broomhoff at 30 Broomhills, Walsingham Garden City, Harlow AL7 1RF. I'd certainly like to see some more from the same author, but with settings sufficiently different.

Very different in its approach is *The Mists of Kush*, also written by a regular reviewer, Bob Aldridge from Enfield, and now available for £5.95 from Quakemans Software, 67 Old Hocking Road, Broomfield, Harlow, Essex CM9 0RN. Though it is based on a short while now, Quakemans' title was telling me that very few copies have been sold, which I can't understand as it's a very good adventure. What's wrong with you adventuresists out there? Every month I get loads of letters complaining that there are so few new Dragon adventures, and yet when people bring them out, no one seems to bother buying them!

Brigands

One of seven and on to the game itself, which is also going to be a multi-part adventure. If enough people buy the first part, entitled *Slack and Bowles*, in this your role is as the only child (made in America and that's later revealed) of a poor redoubt in the temple of Pao Shams. On his deathbed you, his father gave you a gold ring, and begged you to return it to the inner sanctum of the Temple of Pao. This you set out to do, but when you're in sight of the Temple a gang of brigands rob you of all your possessions and dump you in an oasis.

With this exciting start you begin the adventure, and it's important to read the and other location descriptions carefully, as

many are sometimes contained in them, as to what you should do or where you might try to go. The game that reads your keyboard inputs is a little fuzzy, and frequently requires wandering round for the right couple of words even though you'll think you know what it is you should be trying to do. In this aspect of the game's vocabulary is a bit irritating, the location descriptions certainly aren't, which is something that enhances the game. A lot of care has been taken to make the text more descriptive, such as in the only waste land where you find not merely a dead tree, but "A dead tree stands close by like a skeletal monument to some dead hero." Or outside Selam's Cave where "thin wisps of smoke drift out of the entrance and curl gently upwards," though little do you know from the soothing description what awaits you inside the cave!

Input

The program response tends to be rather slow, and it's a little irritating that once the repetitive user input has been printed, you then have to press another key to have the screen updated, after a suitable pause. Also, while initially entering the words later proved to be something of a drawback. This is the feature that gives you a full location description on your first visit, usually about one third of the way through the game. For the most part this doesn't matter, but in one place I found a red dragon baring my way, that when I later returned with what I hoped might save the beast off, it was no longer there. At least it seemed not to be, as I was at a loss for a while as to what to do. The only typed LOOK is a surprise up, but I'll be back. Hereend there was my adversary, which I promptly dispatched.

These little drawbacks don't prevent your enjoyment of the game, however, and I'm a definitely one that is more ruled by the plot and imaginative adventures. Fewer locations is a shame than the two *Space Trek* adventures, but more description and tougher problems all round. Try it.

Now I'm only reviewing Dragon Software version of *Colonial Cave*, and mentioned that I don't have a SAVI issue, which the original magazine version of this classic adventure doesn't have either. That has now been rectified, however, and the command STOP will send you into the SAVI routine, so don't let that look put you off sampling this adventuresist version of a piece of

100

Finally out to some of the equities you've seen in the north: Carl Trust of the Hagerman-based Pasaden Northern Mill Co. (CNM) has compiled a few adventuresome, but is struggling to map jurisdiction. He asks if anyone has made a successful map of the lands, which they might be prepared to photocopy and let him have at a special cost. Over to you, map-makers.

Some clues on that same game come from Michael Emdin's *3 Ladyeys' Head* Rummy Abominations ABB LUK. He reminds other readers that you need to use the tarot's trice, and that you should be able to cross the Yellow Rabbis freely by sitting at the far end of Benaraggs, Brown and Green and moving sensibly from looking to looking. In return Michael would like someone to tell him if you can control the bus in *Chickadee* and also help with three questions on *El Diablo* how to get the eagle's feather where to tip the stick and what are the two corners.

Sgt. John Moore of RAF Wickenburg plays adventures when he's not knocking back cheap beer at the Sergeant's mess; and he's currently lost, wandering round the endless Red Zone at Luftwaffenstrasse. My first service call was in 1986: IHT FFD YAL.

John, Out there tonight as a simple MENT
BETTER JY below can be heard

More successful in the game, which did seem to be demanding the critics.

ately, is the only one of several Nonagen readers I hear from regularly. She's received 87% so far with all 10 tags except the black one. So maybe by the time this appears you'll have successfully completed that and have your order in for the follow-up. He's also written for himself a little machine code system which has enabled him to set all the available commands in Prescaler and 80 Columns. These are too many to list here, but if anyone thinks they might be useful send the size and it will make a few copies available.

More recent hit show magic words from Mark Ingram on *The Real Fudge* HTLONOM and FEELS NEE. It leaves you to figure out where they work. Thomas also is Ray Thomas of *Harvardland* and is

Wrighton on Clark for plans on Sea Cloud and a first portion of help to Wrighton. Wrighton of Charleston also was having trouble because of the Forest Service's plan of the area. "You had got to use a **WILDERNESS** label," Wrighton said, "and you got that from the **SMITHSONIAN** Laboratory. Certainly if you couldn't label Level 2, that was something that applied to both Yellowstone and Ring. Now that's a problem because, evidently, it may be impossible for them to build up enough experience to enable the solution to the problem to become available to you."

Experience tells me I'll be back again next month, and do let me know if there's anything you feel isn't sufficiently covered in the coming week(s)?

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To help puzzled adventurers further, we are instituting an Adventure Helper — simply fill in the coupon below stating the name of the adventure, your problem and your name and address, and send it to Dragon User Adventure Help.

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1000

Abstract.

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How do I cross the deep chasm
in the garden? **Hans O. Rym**
www.adventure-trek.com

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Adventures Through Problems
I have opened the gates in the
United Underground System.

Our online get past the readers
spider. Help! Name: John P.
Address: 85 Springdale
Avenue, Brough, North Ham.
Canada, M2H 1A5

Adventures Jerusalem Adventure
Lee Z. Finkels How do you
 get through the garden gate?
 What happens at the Dead
 Sea? **Marjorie Malcom Burns**
Admiral Broomless **Russell**
Arthur Elie Laven **File** **Spot**
 (over)

Adventure Justification
Problem I can't get the demand—what use is the gift of the language? **Name** Paul Fong's
Address 27 Patsburg Road
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I will return it I will be able to

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gum Highway, Coventry, CV3
6094

Problem: How do you get the food? Where is Bacon Red? **Icon?** Name Simon Johnson
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Harbor: Bixbee, CA 95424
Agreement: **Trickster:** **Problem:**
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Bomb? How do I get into the
Island House? Where is the
Oil? **Name:** Sgt Fred Shaw
Address: c/o Sgt Shaw DC
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Shaw, USA

Adventure Baroness of Quid's Problems I can't find the blue key card, and I can't lose the blue key card, and I can't lose the resurrection card. **Marye**

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the portfolio, and just only find

the north and the type at the
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Green, Adgees FQ Rowers
Close, Thornton Norfolk SP24
4AA.

Adventure: See **Quests** **Problem:** Where do I get the key to get entry to the beach house left? How do I use the defibrillator? **Name:** Matthew Saunders **Address:** 15 Yale Ave. Passaic, NJ 07652

JUNE PUZZLE

Gordon Lee takes a random walk around number operation — and sets this month's new

READERS with programming experience will be familiar with the random features available in Basic, although this is a command which must be used with care as we shall see later. Outside computing, tables of random numbers are used for statistical sampling techniques, then so the use is a relatively modern phenomenon. I don't see the latter line quote from an article by Alfred M. Bown on the subject - "before the twentieth century" - this would seem have thoughts of the possibility of producing books like this one, this would have been any use for it. A thirteenth-century man, then, would have thought it the basis of faith.

Methods used for producing lists of random numbers have been many and varied. In 1927 a table of 41 000 random digits was produced by taking the middle digits of the areas of parishes in England, while in 1948 a table of 105 000 digits was extracted from United States telephone exchange. Other methods have produced dice, roulette numbers, and measurement of the rate of decay of certain radioactive isotopes.

With the arrival of computers (and calculating machines before them) it was soon realised that a random number facility which could be used in conjunction with these machines would be an advantage. Clearly, programming in an actual table of random numbers would be both impracticable and wasteful of memory, so methods were devised which would enable the machine to generate its own series of random numbers.

An early method proposed by John von Neumann was known as the 'middle-of-the-square' method. Here the computer is first 'seeded' with a random sequence of digits.

chessboard) to a given *n*. The computer then squares this number, extracts its middle digit(s) of this square and repeats the procedure as often as required. For example, if we were to start with the number 5678 and extracting the middle four digits each time, we would get the series 5678, 2096, 7408, 8794, 5246, and so on. Note that in generating this series every square with less than eight digits is supplemented with zeros (zeroes added to the left-hand side of the number) to bring the total number of digits to eight, before its middle four digits are extracted. The method readily fit into calculator as the sequences produced were too short, usually terminating in an endless loop of repeating values. Consequently, other, more sophisticated approaches were devised.

As was mentioned earlier, the random number generator on the Dragon is simple. In use, the requester is free to ensure a truly random selection. For example, after switching on the Dragon type-in and running the following line: `FOR P=1 TO 10:PRINT RND(1)` (which will print

As you might expect, the computer will definitely print out a list of odd numbers at random, each number being in the range of 1 to 9. There is nothing surprising about this, but what is surprising is that the numbers so produced are always the same sequence. In the case quoted, a sequence 5, 3, 2, 3, 5, 5, 3, 2, 5, 1, 8, was produced. In practice, this means that some device needs to be written into any program to prevent this degree of predictability occurring. A program which, for example, deals a hand of cards is of little use if it always selects the same deal over and over, that the cards in our hand look like:

1. **Identify the main topic of the passage.**
 2. **Identify the main purpose of the passage.**
 3. **Identify the main argument of the passage.**
 4. **Identify the main conclusion of the passage.**
 5. **Identify the main evidence of the passage.**
 6. **Identify the main counterargument of the passage.**
 7. **Identify the main supporting detail of the passage.**
 8. **Identify the main supporting detail of the passage.**
 9. **Identify the main supporting detail of the passage.**
 10. **Identify the main supporting detail of the passage.**

around this problem. But in the meantime readers might be interested in the following remedy based on a random number selection routine. First of all switch on the Dragon from cold and then type in (or load from tape) the following program:

```

100 C=0; R=0; Y=0
110 PRINT "R T C Y C"
120 G=ABS(C)
130 IF R=1 THEN G=X=0
140 IF R=2 THEN G=Y=0
150 IF R=3 THEN G=X=0
160 IF R=4 THEN G=Y=0
170 IF Y=1 THEN G=0
180 PRINT G

```

When run, the program prints a star in the center of the screen and then selects a series of random numbers in the range -5 to 4 inclusive. A scale is then traced moving up, left, down or right depending on whether the random number was one, two, three or four respectively. A star in each location another star is printed to mark the path taken. Line 80 stops execution of the program when the path extends beyond the top edge of the screen. This curious feature is that I am sure neither the author (Dragon) nor the publisher (produced under the Dragon logo) remembered though. Just each time the program is run the computer must first be switched off then on again and the program reentered.

For this month's competition we are referring to John van Meursen's "Insult of the square" methodical producing a series of random digits. At first most used certain numbers produce short sequences some even are self-repeating. One such example is 3760 whose square is 14073600. However, can you find a four-digit number all of its digits being different, which appears itself after four operations? Good luck!

Index

For the June competition, we've got something to excite Druggers' ardent fans — the long winners will be receiving a copy of Gordon Haxton, from Southern Connecticut, which they deserve as it's their current champion for the Druggers 2004. Hold on a bit — they also say it's "thoroughly hot, sexy and enjoyable and with rain-making hints on it for those of us arguing with it in any case, purely a matter of time... a contemporary success."

Figure 1

As usual to win the game, you must show the answer to this month's competition and show how you solved it, with the use of a program written on your Dragon. For the sake of our strange administrative purposes, please do not send in questions containing a copy of the program, and don't forget to thank your entry — JUNE COMPTON. And we know it sounds obvious, but don't forget to clearly mark your

name and address on your entry — some-
one always forgets — and that might
be threatening to publish the offender
in a hall of shame, so much of

This month's Inference — you — you're going to have to come up with another of those phrases. Try compiling the following words that I found — sometimes can be dangerous because . . . Anything rude will be tolerated around the office and then

March 1990

The Merchandise gateway was 20 copies of Quicken's MSN Express — and contributors go to the following, who will soon be closing their place in Queens of Torrey. Rachel Edwards of Redcliffe Dave Lander of Nottingham. Ray Woods of Barkingdale, J Taylor of Aylesbury. Rita Lindgren of Swanton. G Dean of Enfield. G Richardson of Herts. Douglas Moulton of Rampton. G Hart of Cammerton. J Singer of Tyne Green. A Breakwell of Wyke. Richard Moss of Redcliffe. F Ramsey of

adequacy. Mark Hedges of Washington State, D. Bacher of Suffolk, Colorado, D. Minkler of Maryland, D. Gray of Missouri, through Hyatt Roberts of Newport, P. Anderson of Albany, N.Y. Division of State Courts, Simon Ashbury of Sweden, Klaus Bruns of Germany, J. Gossard of Connecticut, and finally Matthew Gifford of New Brunswick.

The five-breaker produced many natural-looking snippets, but Matthew provided the best bit: "The boat approaching Potters Five in the [screaming feedback] to [unrecognizable terrible destruction] [snapping] at [unrecognizable double duty]." Will Phelipe (University of France) please write internal explain for entry — which were "It said observed there was hundreds of cones. It obviously was something in translation — and was in being some trying to plant its ergonomic seeds."

Age Group	Very important	Important	Somewhat important	Not important	Don't know
18-24	45%	35%	15%	5%	0%
25-34	35%	40%	20%	5%	0%
35-44	25%	35%	30%	10%	0%
45-54	15%	25%	35%	25%	0%
55-64	10%	20%	30%	40%	0%
65+	5%	15%	20%	60%	0%

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